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By
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INTRODUCTION

Grassland farming is a new approach to the economic use of the cutover lands of West Louisiana.

Since the cutting of the pine timber several million acres of West Louisiana land have been allowed to lie idle or partially idle growing scattered trees, grasses, and other native vegetation.

Cattle and sheep have grazed the open range since the timber was harvested. Good land management makes possible more efficient use of the land; half use or less is not enough to support the growing population.

When the once-abundant timber resources were gone, many former timber workers and sawmill employees, who were skilled in the lumber industry, were left to make their living from whatever source might be available to them. In order to make a living many of these people turned to agriculture and attempted to grow row crops.

Row crop general farming proved to be hazardous on these thin soils. These soils are subject to severe erosion, as a result of heavy rains. The row crop farmer on these hill soils, except possibly the truck crop farmer near a good market, is at a decided disadvantage under present conditions. He is attempting to produce products from thin soils, on rolling hillsides, and on small farms with small tools in competition with large farms on level fertile soil with large modern machinery.

The major soil types of the area include Bowie, Ruston, and Beauregard fine sandy loams. The top soil is generally a sandy loam, three to six inches in depth, while the sub-soils range from previous well-drained sandy clays to impervious clays lying in the lower poorly drained flat areas. These soils are deficient in organic matter, and are low in available nitrogen, phosphorus, calcium, and potassium.

The climate is mild and there is an average annual rainfall of more than 50 inches. The rainfall is irregular and every few years a flash flood of eight to ten inches or more may be expected within a period of 24 hours. During other seasons, especially in the fall of the year, there may be periods of several weeks with little or no rainfall. These extremes in the rainfall cycle make row crop farming especially hazardous.

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The Weather Bureau reports some of these irregularities as recorded by the weather station at Leesville. In 1948 the annual precipitation was 48.11 inches, while in 1949 it was 59.99 inches, or a difference of 11.88 inches. In 1950, generally considered a dry year locally, the total rainfall was 58.93 inches, or 5.59 inches above normal. But 44.11 inches fell during the first six months; there was a surplus above-normal for each of the first six months except March. During the last six months there was only 14.82 inches, or a below-normal rainfall for each of the last six months.

Farmers who started new pastures during the fall of 1950 were at a decided disadvantage because of the low rainfall during the last half of the year.

GRASSLAND FARMING

One of the most efficient means of using these soils is by building up the humus content and retaining a layer of sod to hold water, which in turn supports the sod. This is done through the process of building good pastures and harvesting them by grazing livestock.

Building up pastures requires the use of available minerals that are lacking in the soils in their native state, and the use of properly established improved grasses, clovers, and lespedeza or other legumes to supplement native grasses. By using the above practices, grazing has been produced during every month of the year. The production of winter grazing requires good management and a knowledge of when to graze and what to graze.

KINDS OF PASTURE

One pasture mixture is not enough. No single pasture plant or combination of plants has been found at this Station that will furnish grazing 365 days in the year on the same land. Seven pastures were fenced and grazed separately as a means of testing pasture plant mixtures that, when grazed in rotation, would lead toward a twelve months' grazing program.

The purpose of this study was to determine:

1. Which grasses and legumes grow well together to produce high yields.
2. The period of year they produce.
3. Pasture costs and returns per acre.

LAND PREPARATION AND STEPS USED IN ESTABLISHING A PASTURE

Land preparation on these seven pastures consisted of plowing under native vegetation in the summer, disking the land at least once (or twice where necessary), and dragging the surface smooth in preparation for a good seedbed and the operation of machinery.

Since fescue is a relatively new grass for this area, we use it together with Louisiana white clover or Louisiana white clover and oats to outline the steps used in establishing a pasture from range land.

1. Land plowed shallow and not below surface soil. 2. Disk land once or twice as needed. 3. The harrow aids in preparing a smooth surface. 4. The cultipacker leaves a firm ideal seedbed.

Fescue grass may be planted in September or about one month ahead of the time for planning white clover. This gives the grass a month longer to grow. But if clover is planted early with the grass, dry, hot weather often kills many of the young clover plants, causing a reduction in the stand or the necessity of planting heavy amounts of seed to allow for the dying out of the young plants.

Flat break the land in July. Broadcast 1½ to 2 tons of lime per acre, preferably two to three months before plowing land. Disk land in August; drag it down smooth. About September 15, apply broadcast a 50-100-50 fertilizer in one of the following or similiar mixtures:

1. 400 pounds of 2-12-12 and 500 pounds of basic slag, also 33 pounds of nitrogen (in either 100 pounds of ammonium nitrate or 200 pounds nitrate of soda).
2. 400 pounds of 12-12-12 and 500 pounds of basic slag.
3. 400 pounds of 12-24-12.

The above fertilizer application is for a first-year pasture. Disk fertilizer into the soil about September 15 and drag the land lightly with a board or other satisfactory drag. If the land is very rough, it should be dragged heavily before applying the fertilizer, then redragged lightly or harrowed after disking in the fertilizer.

About September 15 sow 10 to 12 pounds of fescue seed per acre. Fescue seeds are small and should be sown on the surface and pressed into the soil with a cultipacker. They may be planted with a Cultipacker Seeder.

About October 1 to 15, after the ground is thoroughly wet and preferably between showers, sow on this firm seedbed, which was cultipacked when fescue was planted, 4 to 6 pounds of inoculated Louisiana white clover seed per acre. If grazing is expected the first year, 2 bushels of oats may be added to the above mixture and covered sufficiently deep just ahead of planting the fescue. Both grass and clover may be planted with success in October by cultipacking the land and then sowing the seed and rolling the land again with the cultipacker.

The above fertilizer mixtures will not apply to all soils and are for general use only. Rates and kinds of fertility should be determined by a laboratory analysis of the soils to be treated.

FERTILIZATION

Research during the last few years has shown that most of the soils in the West Louisiana hill area are naturally deficient in lime, phosphate, potassium, and nitrogen. Adequate fertilization is one of the most important steps in their efficient use for the production of pastures.

These seven pastures were fertilized similarly in order to put them on a comparable basis. In the fall of 1948 they were limed at the rate of one to two tons per acre according to their needs. Fertilizer was applied at the rate of 500 pounds of 8-8-8 and 500 pounds of basic slag.

In the fall of 1949 500 pounds of 3-12-12 fertilizer were applied.

Lime and fertilizer should be applied uniformly.

In 1950 one-half ton of basic slag, 100 pounds of 60 per cent muriate of potash, and 133 pounds of 33.5 per cent nitrogen were applied.

Fertilizer used in 1951 was 200 pounds of 33.5 per cent nitrogen in the spring, and 500 pounds of 12-12-12 in the fall.

BEEF PRODUCED PER ACRE

Table I shows the yield of beef per acre for each of the seven pastures. It also shows the months in which gains were made.

Ladino Clover and Fescue Grass

This pasture furnishes its best grazing during the period of March 1 to July 1. Some grazing may be expected during winter under favorable weather conditions. During the two-year period 1950-51 the stand of Ladino clover diminished until most of the grazing was supplied by fescue during the second year. Ladino clover requires abundant moisture, and the stand was reduced by summer droughts. Two-year records show an average annual yield of 250 pounds of beef per acre.

Singletary Peas, Rye Grass, and Bermuda Grass

The Singletary pea is an annual legume that furnishes early grazing. Some years it may be grazed as early as January. Its earliness depends on adequate fertility and weather conditions. Peas may be grazed until about the middle of May.

TABLE 1.
Pounds of Beef per acre from Different Pasture Plant Mixtures
Two-Year Average, 1950-1951

Month Grazed	Ladino Clover, Fescue	Singletary Peas, Rye Grass, Common Bermuda	Louisiana White Clover, Fescue	Crimson Clover, Fescue	La. White Clover, Dallis Grass, Fescue	Louisiana White Clover, Dallis Grass	La. White Clover, Dallis Grass, Rye Grass
Jan.	0	73	22	0	0	13	19
Feb.	0	31	38	0	0	18	38
March	87	45	126	134	96	7	101
April	60	46	115	93	103	51	117
May	51	33	85	118	92	26	60
June	35	12	40	61	9	42	45
July	0	35	14	0	10	106	55
Aug.	0	14	0	0	55	10	16
Sept.	0	31	0	0	0	31	16
Oct.	0	0	0	43	0	13	3
Nov.	17	51	29	0	14	12	47
Dec.	0	0	0	0	0	0	0
Two-Year average	250	371	469	454	379	329	517

This mixture has produced one of the longer growing season pastures. It should be grazed very carefully the first year, being sure a good seed crop of peas shatters to the ground.

Yields were 172 pounds per acre in 1950 and 570 pounds in 1951, or a two-year average yield of 371 pounds of beef per acre. The grazing is distributed over about eight or nine months of the year. During 1951 this pasture furnished 234 cow days grazing with an average daily gain per animal unit (cow equivalent) of 2.44 pounds.

Singletary peas work well in combination with rye grass. When they begin to form fruit pods, they cause a toxic condition in cattle. This toxic condition causes lameness, making it necessary to remove the animals from the pasture. Cattle appear to recover in a few days when grazed on another kind of pasture. Removing the livestock when pods begin to form on the plant makes possible a seed crop which, if allowed to shatter to the ground, comes up the following fall. This legume stores nitrogen in the soil which aids in the growth of Bermuda grass that follows during the summer.

Louisiana White Clover and Fescue Grass

This is an early pasture that may furnish light grazing as early as January, during a favorable season, and heavy grazing during March, April, and May. It may also furnish light grazing until August if there is sufficient moisture.

The yield was 370 pounds per acre in 1950 and 569 pounds per acre in 1951, or a two-year average yield of 469 pounds of beef per acre. During 1951 it provided 152 animal days grazing per acre, which resulted in an average daily gain of 3.74 pounds per animal unit.

Crimson Clover and Fescue Grass

This combination produces a heavy growth and may be grazed as early as January during a favorable growing season. This pasture furnished heavy grazing the first of March during the two-year period. Its heaviest yield was produced during March and April. Crimson clover seed matures during May. The pasture is allowed a few days rest while seeds are maturing so that plenty of seeds shatter to the ground to come up in the fall. After the seeds were mature the pasture was mowed and grazed again as soon as the grass had made sufficient growth.

The yield was 472 pounds per acre in 1950 and 436 pounds per acre in 1951, or a two-year average yield of 454 pounds of beef per acre. During 1951 it produced 116 animal days grazing per acre. The cattle made an average daily gain of 3.76 pounds per animal unit.

Louisiana White Clover, Dallis Grass, and Fescue Grass

This pasture furnished grazing from about March until September, depending upon the amount of moisture present. Earlier grazing may be expected during a mild winter.

Twenty pounds of fescue were drilled on the white clover-Dallis grass sod in the fall of 1949. The season was very dry and the fescue stand was thin. In the fall of 1950 eight additional pounds were drilled in. It has been difficult to established and maintain fescue planted on sod. The yield was 427 pounds per acre in 1950 and 331 pounds in 1951, or a two-year average yield of 379 pounds of beef per acre. This pasture furnished 192 animal days grazing per acre in 1951 with an average daily gain per animal unit of 1.73 pounds.

Louisiana White Clover, Dallis Grass, and Rye Grass Compared with Louisiana White Clover and Dallis Grass Only

Two 15-acre Louisiana white clover and Dallis grass pastures were plowed, planted, fertilized, and seeded alike in the fall of 1948. Both pastures were fertilized alike thereafter.

In September, 1949 and again in 1950 15 to 18 pounds of rye grass seed to the acre were lightly drilled into the sod on one of the pastures, while the other remained in white clover and Dallis grass only.

TABLE II
Effects of Rye Grass on Yield of Beef

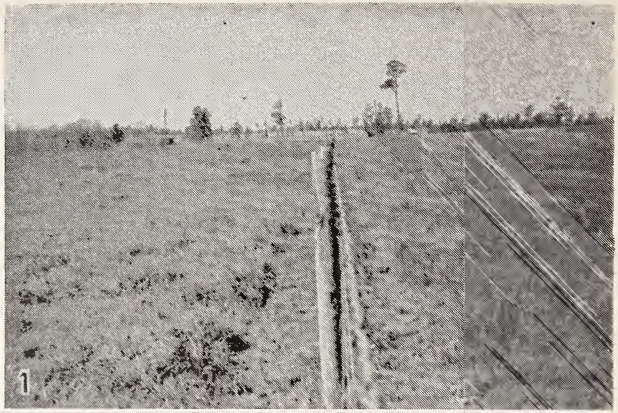
Month	Dallis Grass, Louisiana White Clover (Two-Year Average, 1950-1951)	Dallis Grass, La. White Clover, Rye Grass (Two-Year Average, 1950-1951)	Increase or Decrease in Yield Due to Rye Grass
January	13	19	6
February	18	38	20
March	7	102	95
April	51	117	66
May	26	60	34
June	42	45	3
July	106	55	—51
August	10	15	5
September	31	16	—15
October	13	3	—10
November	12	47	35
December	0	0	0
Total	329 lbs.	517 lbs.	118 lbs.

A Louisiana white clover—Dallis grass pasture where rye grass was drilled on the sod each September produced 442 pounds of beef per acre in 1950 and 593 pounds in 1951, or a two-year average yield of 517 pounds per acre as shown in Table II.

In 1951, the rye grass combination furnished 223 cow days grazing per acre with an average daily gain of 2.66 pounds.

In the pasture containing white clover and Dallis grass only, the yield was 337 pounds per acre in 1950 and 322 pounds in 1951, or a two-year average yield of 329 pounds per acre. During 1951 this pasture furnished 159 days grazing with an average gain of 2.03 pounds a day.

1. Rye grass on the left, winter weeds on the right. 2. Rye grass retards the growth of winter weeds. Grazing allows the clover a chance to develop. 3. Tall winter weeds crowd out the clover and must be mowed to allow the clover to come through.



The addition of rye grass, seeded annually at a cost for seed of about $2.50 per acre, increased the average annual gain of beef by 188 pounds per acre. The extra cost for seed was less than two cents a pound for the additional 188 pounds of beef produced.

Most of this increase in yield came during the period from November 1 to May 1. After May the rye grass died out and was gradually replaced by Dallis grass. The pasture that had no rye grass gave a little higher yield during the period from July 1 to November 1.

During 1951, the pasture containing rye grass carried 40 per cent more animal units per acre, or furnished 40 per cent more days grazing than the pasture without rye grass.

PASTURE COSTS AND RETURNS

In arriving at the costs of pastures it was assumed that it is necessary to replow the land and reseed pastures every third year. Present conditions of the pastures indicate that this assumption may be incorrect, but some basis has to be used to arrive at costs. This test has not been in effect long enough to determine how long these pastures can be maintained. If pastures need replowing only every five or ten years or even longer the cost would be reduced accordingly.

Average Annual Costs

Fertilizer Cost, 1950-51		Fertilizer Cost, 1951-52	
½ ton basic slag	$10.00	500 lbs. 12-12-12	$19.20
100 lbs. 60% potash	2.60	100 lbs. 33.5% nitrate	3.61
333 lbs. 33.5% nitrate	12.33		
Total	$24.93	Total	$22.81

Average annual fertilizer cost	$23.87
Lime applied every third year equals annual cost of	3.41
Land preparation every third year equals annual cost of	5.00
Clover seed, 5 lbs. @ 80c every third year equals cost of	1.33
Dallis grass seed, 15 lbs. @ 80c every third year equals annual cost	4.00
Rye grass seed, 20 lbs. @ 12.5c equals annual cost	2.50
Mowing three times annually	3.00
Average annual cost per acre	$43.11

Average Annual Returns

The seven pastures containing 59 acres gave a two-year average yield of 405 pounds of beef per acre.

405 pounds beef @ 26¼c	$106.31
Less average annual costs	$ 43.11
Average annual returns per acre	$ 63.20

The above costs are total costs and do not take into consideration assistance available from Production and Marketing Administration.

PASTURE USE AND MANAGEMENT

Management is the most important factor in determining whether or not a pasture makes a profit. Soil moisture and fertilization are the major controlling factors that determine the production of a pasture.

During 1949 these pastures were used for producing seed and for limited grazing.

In 1950 and 1951 they were grazed and cattle weights were kept in order to measure their yield. The yield was measured in pounds of beef per acre. Good grade cows and calves of the Aberdeen Angus and Hereford breeds were used to measure yields. Cattle were weighed at the end of each calendar month and changed from one pasture to another. Cattle, were rotated from pasture to pasture in an attempt to eliminate differences in cattle being used to determine yields.

When on good pastures heifers graze only about five or six hours during the day.

The number of acres necessary to support a cow and her calf will vary from month to month and year to year. There are periods during March, April, and May when an acre may be too much for a cow and her calf. After July the cow alone may need as much as two additional acres during periods of severe drought.

Where all pastures are seeded to the same mixture, the available grazing tends to be exceedingly high during the peak season of production and very low during other periods of the year. Three plants in the same mixture have worked well on the trails made at this Station. The two sets of plant combinations giving the longest growing period have

been: 1, Louisiana white clover, Dallis grass, and rye grass; 2, Singletary peas, rye grass, and Bermuda grass.

Pastures are grazed heavily during their peak season, but good management requires a close watch in order to avoid over grazing which results in feed infestation at a later period.

During winter the cattle are fed grass and legume mixed hay and cottonseed cake or meal. The quantity depends on the amount of available grazing. Cattle are not fed while on pasture under grazing test. Bulls are fed a special ration. They are especially well fed for a period of about three months prior to the breeding season and during breeding season. After breeding season a good pasture may be sufficient. Cattle have free access to a mineral supplement consisting of phosphorus, calcium, and salt at all times.

Consistent heavy annual applications of a complete fertilizer on limed soil for a period of three or four years has resulted in a good pasture of Louisiana white clover, Dallis grass, and native grasses without plowing the land. Plowing and preparing a good seedbed has made possible a pasture of about the same grazing capacity within a period of four to six months.

Clovers and winter grasses, such as rye and fescue, are planted in the fall. Lespedeza and summer grasses, like Dallis grass, Bermuda and carpet, are planted in the spring.

Where pastures are established by plowing, care should be taken to plow shallow and not below the depth of the surface soil.

Since most of the cattlemen of West Louisiana operate on a cow and calf basis, the data shown here are also on that basis. In that way the results here are directly applicable to the stockman's type of operation.

BLOAT

Bloat in cattle has been studied at this Station in connection with other pasture and livestock problems.

Its occurrence has been prevented by the use of a good stand and a continuous growth of grass interplanted with the clover during the entire clover growing season.

SUMMARY AND CONCLUSIONS

This study deals with grassland farming as it relates to the use of the cutover land of West Louisiana.

Seven pastures were planted to different mixtures and grazed by cows and calves to measure their returns in pounds of beef per acre.

Louisiana white clover and Dallis grass in which rye grass was sown each September gave the highest two-year average yield, 517 pounds of beef per acre. This was the best pasture mixture used. This mixture also produced the longest grazing season, approximately ten months. It produced 188 pounds more beef to the acre than a similar Louisiana white clover and Dallis grass pasture that did not have rye

grass seeded in the fall. The additional rye grass resulted in a 57 per cent increase in beef yield over the two-year period. The pasture without rye grass produced a two-year average yield of 329 pounds per acre.

Louisiana white clover and fescue grass produced a two-year average yield of 469 pounds of beef per acre. This is a good combination for producing early grazing. This pasture produced grazing between November and July.

The Ladino clover and fescue grass pasture furnished most of its grazing from March through June. During 1950 and 1951 the clover stand was materially reduced as a result of dry weather. The two-year average yield was 250 pounds per acre.

Singletary peas, rye grass, and common Bermuda grass is one of the best combinations. This mixture furnished grazing for about ten months of the year. The two-year average yield was 371 pounds of beef per acre.

Louisiana white clover and fescue makes a very productive early pasture. It may be expected to furnish heavy grazing in March, April, and May, depending upon weather conditions. The two-year average yield was 469 pounds.

Crimson clover and fescue grass furnishes heavy grazing during March and April. The two-year average yield was 454 pounds of beef per acre. Most of the grazing was produced between February and June. Earlier grazing can be expected under favorable weather conditions. For greatest efficiency this pasture requires heavy grazing during its peak season.

The two-year average yield for Louisiana white clover, Dallis grass, and fescue grass was 379 pounds of beef per acre. Heaviest grazing is furnished from March through August. This is a good combination. More time is needed to study its possibilities.

The seven pastures produced a two-year average yield of 405 pounds of beef per acre. The annual cost for lime, fertilizer, seed, and mowing was $44.91. The annual return per acre above these costs was $61.40.

Use of the seven pastures in rotation with native grasses, native grasses and lespedeza, or Dallis grass and lespedeza has furnished grazing during every month of the year.

Since more than 95 per cent of Louisiana's beef cattle feed comes from grasses and forage crops, one of the most efficient means found thus far for using these lands is through the use of productive pasture grazed by good livestock.

Feed produced from the soil, grazed by good livestock twelve months of the year, on pastures spotted throughout a new forest that furnishes shelter for livestock while growing a profitable crop of trees, is a sound approach to the economic use of the rolling plains of West Louisiana.